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ABSTRACT

Changes in manipulative play with objects were examined in a longitudinal sample of 10 boys and 9 girls tested at ages 9, 13, and 18 months. Stability of individual differences in play was also examined. Each child was observed individually for 7 minutes in a room in which a tea set was the only toy present. Seven types of play behavior were scored: banging, mouthing, simple relational acts, accommodative relational acts, symbolic acts, and sequential acts. Clear differences in play were apparent between 9- and 13-month-olds. Generalized motoric schemes declined, while exploration of physical and functional relations between objects increased. In addition, symbolic play appeared for most children at 13 months of age. Further developments in types of symbolic play were present at 18 months. Infants demonstrating an early head start in maturity of play at 9 months tended to maintain this advantage through 13 months. It is suggested that since children's actions identify newly emergent cognitive themes, observations of play can provide valuable insights into the course of cognitive growth. (Author/CM)

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Dimensions of Infant Play

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Running head: Dimensions of Infant Play

Abstract

Changes in manipulative play with objects were examined in a longitudinal sample of 10 boys and 9 girls tested at ages 9, 13, and 18 months. Clear differences in play were apparent between 9 and 13 month-olds. Generalized motoric schemes declined, while exploration of physical and functional relations between objects increased. In addition, symbolic play appeared for most children at 13 months of age. Further developments in types of symbolic play were present at 18 months. Infants demonstrating an early head start in maturity of play at 9 months tended to maintain this advantage through 13 months.

Dimensions of Infant Play

The present research focused on developments in the infant's ongoing stream of behavior while engaged in spontaneous manipulative play in an attempt to define those variables which best describe the structure of this activity. A cross-sectional study of spontaneous manipulative play in infants between 7 and 20 months of age by Fenson, Kagan, Kearsley, and Zelazo (1976) demonstrated a clear developmental progression in the types of play occurring between 7 and 20 months. Close physical inspection of individual objects and the application of generalized motor schemes (such as shaking and banging) predominated at 7 and 9 months of age. These behaviors gave way to exploration of physical and functional relationships between objects at 13 and 20 months. Most of the children in the two oldest groups also exhibited simple symbolic acts. Behavioral diversity (the number of different acts demonstrated) showed a steady increase across the age range studied, as did behavioral sequentiality (coherency) from act to act.

These findings indicated the period from 9 to 13 months as a time of significant cognitive growth as indexed by the beginnings of relational and symbolic play. The period from 13 to 20 months appeared to be a time of further developments along the same dimensions, characterized largely as a period of consolidation of the rapid gains achieved between 9 and 13 months.

The present study had two purposes. The first was to evaluate the validity and accuracy of the previous findings with a longitudinal sample. The second purpose concerned individual differences in play. In the prior

study, some children at each age were clearly more advanced than their peers in terms of the competencies they demonstrated. The longitudinal design of the current study permitted assessment of the stability of those differences: i.e., would the children whose play was more advanced at one age level demonstrate subsequent cognitive skills earlier than their peers?

Method

Subjects

Twenty two middle-class children equally split by sex were tested at 9 months of age. Attrition reduced the final sample to 19 children (10 boys, 9 girls), each of whom was tested longitudinally at 3 ages (9.5 mos., 13.5 mos., and 18.5 mos, range = ± 10 days at each age.)

Procedure

Each child was tested individually with his/her mother present, in a room measuring 20 x 40 meters. The only toy present was a metal tea set which consisted of 2 cups, 2 saucers, 2 spoons, and a pot with a removable lid.[1] The duration of each session was 7 minutes. The mother was seated at a standard location in an easy chair 2 meters from the initial location of the tea set. The mother was asked not to initiate any interactions with her child nor to direct him/her in any way, but to otherwise respond normally to her child's overtures.

The child's behavior was observed from an adjacent room through a one-way mirror. The following 7 types of play were scored: (1) Banging --striking an object against another object or against the floor; (2) Mouthing--tasting or chewing on an object, where pretending to eat was

not clearly implied; (3) Simple relational acts--combining 2 objects in an other than clearly appropriate manner, e.g., touching the lid of the pot to a saucer; (4) Accommodative relational acts-- combining 2 objects in an appropriate manner, e.g., placing the lid on the pot or a cup on a saucer; (5) Grouping--associating (matching) 2 like objects, e.g., touching 2 cups or 2 spoons together; (6) Symbolic acts--any act involving pretending, including eating, drinking, stirring, pouring, or spooning (i.e., transferring imaginary substance from a container to the mouth or from one container to another); (7) Sequential acts--performing 2 consecutive acts which reflected a similar theme, e.g., placing each cup in turn on a saucer or stirring a spoon first in a cup and then in the other cup or in the pot.

Measures of the diversity or variety of actions displayed by each child were also obtained. Diversity indices were determined separately for accommodative relational acts, for symbolic acts, and for a combined measure (called number of different acts) which included accommodative relational acts, symbolic acts, and grouping. In each case, diversity was defined as the number of different acts in that category, disregarding frequency of occurrence beyond the first instance.

Results

Developmental trends in play

Table 1 summarizes the data for the 3 age groups and indicates the results of statistical analyses. The frequency data was subjected to a Friedman two-way analyses of variance by ranks. The resulting chi-squares were significant ($p < .05$) for all variables except mouthing and simple

relational acts. For the remaining variables, pairwise comparisions were then tested for statistical reliability with the Wilcoxon matched pairs signed rank test ($p < .05$, 2-tailed).

The major contrast in play profiles occurred between 9 and 13 months. Few infants at 9 months performed acts of grouping or symbolic or sequential acts while many infants displayed these responses at 13 months (see lower portion of Table 1). Moreover, the frequency of accommodative relational acts, grouping, and symbolic acts increased significantly between 9 and 13 months (see upper portion of Table 1). The frequency of sequential acts did not increase significantly between 9 and 13 months, though the number of children exhibiting at least 1 sequential increased threefold between these 2 ages. Finally, play became considerably more diverse between 9 and 13 months as reflected by all 3 diversity measures. Play at 18 months was largely indistinguishable from play at 13 months on these variables.

The specific response types comprising the major response categories of Table 1 are shown in Table 2. These data confirm the generality of the changes in play noted between 9 and 13 months. Moreover, these data identify several new developments in symbolic play between 13 and 18 months which were not apparent in Table 1. Specifically, acts of eating/drinking and stirring decrease in frequency of occurrence between 13 and 18 months, whereas pouring, spooning, and feeding mother increase in frequency during this period.

Stability of individual differences

The longitudinal design of the present study made it possible to determine whether children who predated their peers in the expression of

certain competencies at a given age continued to predate their peers in the achievement of other competencies at a subsequent age. Questions regarding stability were limited to the 9 to 13 month period because of the apparent ceiling effects encountered for play at 18 months. Inspection of Table 1 suggested that the best indicators of advanced play at 9 months were the presence of accommodative relational and symbolic acts. Similarly, the best measure of advanced play at 13 months appeared to be grouping in that the number of children displaying grouping reflected a steady increase across the 9 to 18 month age range. Of the 10 children who displayed accommodative relational acts at 9 months 7 (70%) displayed at least one instance of grouping at 13 months. Of the 9 children who did not perform accommodative relational acts at 9 months, only 3 (33%) displayed any acts of grouping at 13 months. Similarly, of the 5 children who performed symbolic acts at 9 months, 4 (80%) performed at least 1 act of grouping at 13 months. Of the 14 who did not perform any symbolic acts at 9 months, only 6 (43%) demonstrated any grouping at 13 months. Thus, these data suggest some stability in rate of development between 9 and 13 months.

Nonetheless, a retrospective examination of the play of the children who performed the most advanced acts at 13 months--pouring (N=2) and spooning (N=4)--shows that only 1 demonstrated accommodative relational or symbolic acts at 9 months. To the extent that one can generalize from these findings, it appears that children whose early development is rapid may well maintain their advantage, but that some other children who begin more slowly may catch up and even surpass the others.

The above inquiry pertained to the rate of acquisition of new cognitive skills, what Piaget has called vertical progression. Another type of individual difference, termed horizontal decalage by Piaget, refers to the extent to which infants generalize stage-appropriate behaviors to varying applications (Corman and Escalona, 1969). In the present data, horizontal decalage is probably best indexed by the overall diversity measure, number of different acts. A median split of the 9 month sample yielded a high diversity group (N=10) with a mean diversity index of 4.0 and a low diversity group (N=9) with a mean diversity score of 0.2. The mean diversity scores for these 2 groups did not differ significantly at 13 months ($\bar{X}$'s = 9.3 and 9.8, respectively). Although it is possible that individual differences in stability became more stable by 13 months, the apparent ceiling effect encountered at 18 months precluded formation of new high and low diversity groups at 13 months for comparison at 18 months.

Discussion

The present longitudinal data confirm the results of the previous cross-sectional study by Fenson, Kagan, Kearsley, and Zelazo (1976), suggesting significant changes in play between 9 and 13 months. In both studies, generalized motoric schemes declined in frequency between 9 and 13 months, while accommodative relational acts, grouping, and symbolic acts increased in frequency during this period. However, while the frequency of symbolic acts increased significantly between 13 and 20 months in the cross-sectional study, the frequency of these acts at 13 months in the longitudinal study approximated the 20 month level in the prior study.

This discrepancy is apparently attributable to differences in the toys used in the two studies. In the present study, only a tea set was present during the play session, while in the former study, a number of other toys were also included.. The larger toy set may have been distracting to the younger children, diluting the quality of their play. This hypothesis is bolstered by the fact that play at 18 months in the present study did not differ appreciably from play at 20 months in the prior study. This same factor may explain why Inhelder and her colleagues (Sinclair, 1970; Inhelder, 1971) found grouping, symbolic acts, and sequential acts emerging somewhat later in time than in the present case.

The later emergence of acts of pouring and spooning relative to acts of eating and drinking suggests that pouring and spooning may represent a higher level of symbolic play. For the most part, symbolic acts at 13 months were self-directed, that is, symbolizations of the child's own actions. Piaget (1962) has suggested that the child's first attempts at pretending will be self-directed and that only later will his/her symbolic acts become other-directed, as for example, feeding a doll. Past research has confirmed this developmental trend (Inhelder, 1971; Lowe, 1975; Nicolich, 1977; Watson and Fischer, Note 1). Piaget has maintained that this trend is one manifestation of the process of decentration in the child's use of symbols. While pouring and spooning are not other-directed, they are outer-directed;[2] as such, they may reflect additional aspects of decentration.

The high incidence of stirring at 13 months presents a puzzling contrast to pouring and spooning. Stirring is also apparently an outer-directed act, yet it occurs contemporaneously with self-directed symbolic

acts. One possible resolution of this discrepancy is methodological. It is possible that stirring may in fact simply reflect that a child knows what to do with a spoon. Viewed in this way, stirring would constitute an accommodative relational act rather than a symbolic act.

The general comparability of play at 13 and 18 months excepting the differences just noted suggests that play with the tea set taps changes that are largely completed by 13 months, thereby not providing an adequate basis for assessing further developments in play. Probable developments in play in the second year in addition to elaboration of representational skills include increasing sequentiality and organizational activities that extend beyond simple grouping of pairs of similar objects. Demonstration of a possible shift in pretend play from inner to other-and outer-directedness would have been facilitated by the addition of a toy doll or animal. The presence of several different dolls, various items of food, etc. might have elicited more complex grouping activities at 18 than at 13 months. An expanded toy set might also have revealed increases in behavioral diversity and sequentiality. However, provision of additional toys can only be effective when salient dimensions of behavior are tapped. Fein and Apfel (Note 2) supplied many of the items suggested above yet failed to note marked changes between 18 and 24 months. But sequentiality was not measured nor was a differentiation made among varying levels of symbolic play, a step which Nicolich's (1977) subsequent findings indicate is important for describing developments in play from 18 to 24 months.

The finding that most specific response types are in a continual state of change (either increasing or decreasing in frequency) relates to

Piaget's principle of functional assimilation which states that new schemes are practiced most when newly acquired. Around their first birthday, children are rapidly developing an understanding of physical and functional relationships and explore those concepts incessantly in their play. By 18 months, children are beginning to consolidate their knowledge of simple relationships and therefore do not explore them so extensively or repetitiously. Hence, some types of relational acts begin to decrease (see Table 2). By that time, children are gaining new representational abilities and new types of symbolic play appear. Thus, in their continuing quest for mastery (R. White, 1959), children act, and their actions identify newly emergent cognitive themes. As a consequence, observations of play can provide valuable insights into the course of cognitive growth.

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1. Watson, M. W. and Fischer, K. W. Developmental sequence of agent use in late infancy. Unpublished manuscript, 1976.

2. Fein, G. G., and Apfel, N. H. The development of play: style, structure, and situations. Paper presented at Society for Research in Child Development, Denver, April, 1975.

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Footnotes

[1]The tea set was not sex-biased for the age range comprising the present sample. No mother reported having a similar toy at home through the 13 month session, though several subsequently purchased a similar item. Most mothers reported that playing with pots and pans in the kitchen was a favorite activity, but this applied equally to boys and girls.

[2]The distinction between other-and outer-directed acts resulted from discussions with Douglas S. Ramsay.

Table 1

Mean frequencies for all dependent variables by age group and number of children making one or more responses of each type.

	Age in months			
	9	13	18	
	Frequency[b]			Friedman test (chi square values)[a]
Banging	2.8	1.7	0.4	14.55*
Mouthing	8.6	1.7	0.4	4.97
Simple relational acts	5.9	3.6	1.5	3.97
Accommodative relational acts	8	26.7	24.5	14.00*
Grouping	0.1	2.0	2.1	7.28*
Symbolic acts	0.8	12.7	12.4	12.50*
Sequential acts	1.6	2.2	1.8	6.03*
No. different accommodative relational acts	1.3	3.8	4.5	17.55*
No. different symbolic acts	0.4	2.9	4.1	19.50*
No. different acts[c]	2.3	9.6	10.9	18.97*
	Number of children exhibiting at least one instance			
Banging	15	10	4	
Mouthing	11	9	5	
Simple relational acts	14	14	11	
Accommodative relational acts	11	19	19	
Grouping acts	1	10	13	
Symbolic acts	5	18	16	
Sequential acts	4	13	12	

Table 1

(continued)

[a]An asterick next to a chi-square value indicates that the Friedman test was significant ($p < .05$).

[b]A connecting line between any pair of means signifies that the difference between those 2 means was not significant as determined by a 2-tailed Wilcoxon matched pairs signed ranks test ($p < .05$).

[c]Includes accommodative relational acts, grouping, and symbolic acts.

Table 2

Mean frequencies for most common instances of each response class and number of children making one or more responses of each type.

Response Class	Frequency			Number of children exhibiting at least one instance		
	Age in months					
Accommodative Relational	9	13	18	9	13	18
Lid on pot	3.0	10.2	9.2	8	17	18
Spoon in cup	3.7	7.9	4.1	8	18	17
Spoon in pot	0.6	4.9	3.8	2	16	13
Spoon in saucer	0.2	1.3	0.8	3	11	9
Cup in saucer	0.1	0.6	2.2	2	5	16
Saucer on cup (as a cover)	0.0	0.4	0.3	0	4	6
Saucer on pot (as a cover)	0.1	0.4	0.1	1	4	2
Pot on saucer	0.1	0.4	0.6	1	4	6
Grouping						
Saucers	0.0	1.2	0.9	0	8	7
Cups	0.1	0.7	0.7	1	6	10
Spoons	0.1	0.1	0.3	1	1	3
Symbolic Acts						
Eat or drink	0.7	4.8	2.8	6	12	14
Stir	0.7	5.5	2.7	1	16	10
Pour	0.0	0.2	3.8	0	2	13
Spoon	0.0	1.3	1.6	0	4	6
Feed mother	0.0	0.0	0.3	0	0	2